RECLAMATION
*Managing Water in the West*

# REVISED BIOLOGICAL ASSESSMENT

**For the**

## Volta Wildlife Area Level 2 Diversification/ Incremental Level 4 Development Pilot Project

**Project Location**

VOLTA WILDLIFE AREA, MERCED COUNTY, CALIFORNIA

USGS 7.5 minute Quadrangles: Ingomar and Volta, CA

Prepared by:

U.S. Department of the Interior
BUREAU OF RECLAMATION
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Sacramento, California

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# 1 INTRODUCTION

The purpose of this document is to review the proposed action in sufficient detail to determine the effect on any of the threatened, endangered, proposed, or sensitive species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This document is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C 1536(c)).

The following listed species ***may be affected, is likely to be adversely affected*** by the proposed action and is further addressed in this document:

- Giant Garter Snake (*Thamnophis gigas*) – Threatened

## 1.1 Background

Pursuant to the Central Valley Project Improvement Act of 1992 (CVPIA), Section 3406(d), the Secretary of the Interior, through the Bureau of Reclamation (Reclamation), is obligated to provide firm water supplies of suitable quality to 19 specific wetlands and wildlife habitat areas (refuges) within the Central Valley, including the Volta Wildlife Area (WA) and the Grassland Resource Conservation District (GRCD).

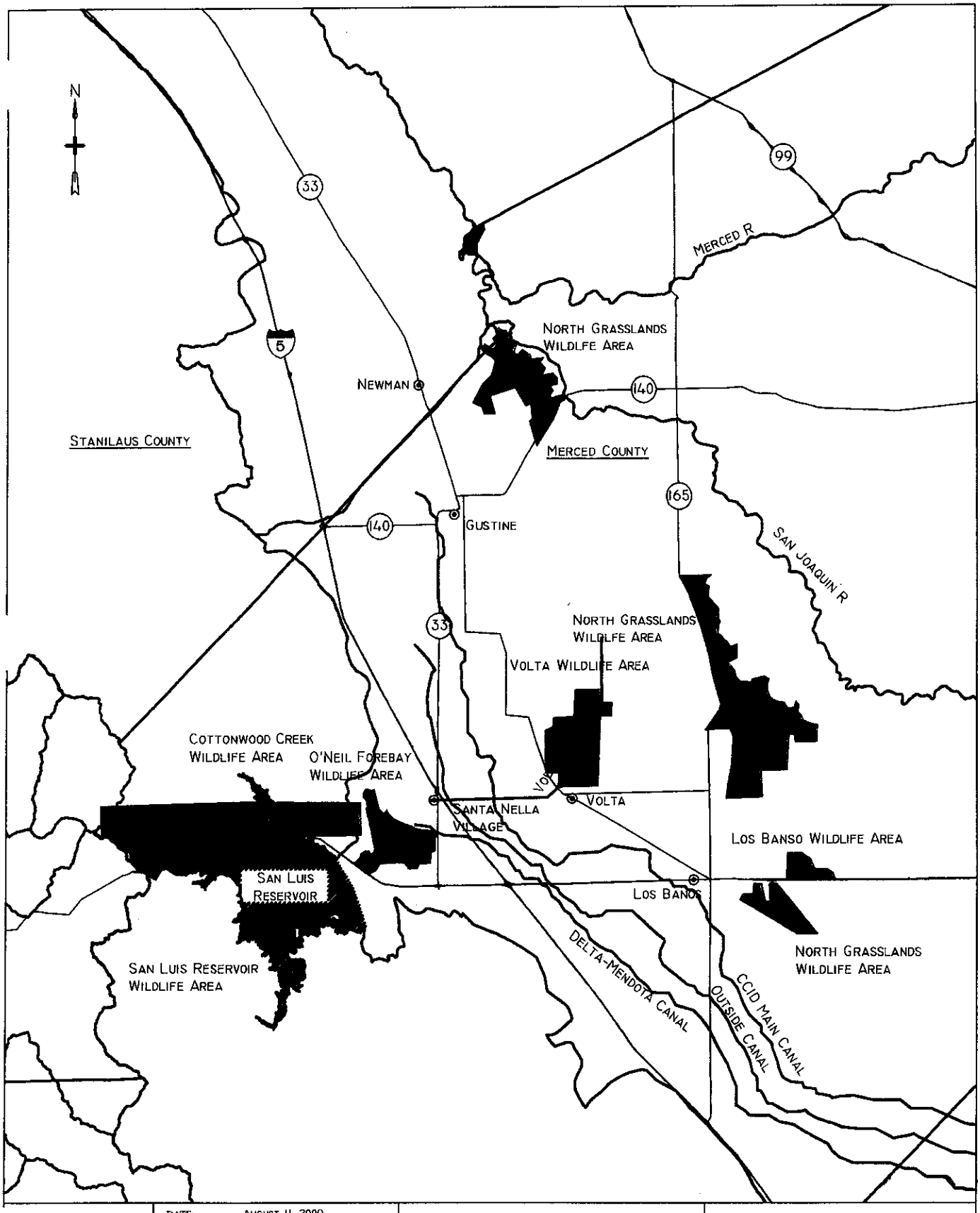
Annual refuge water allocations were established in the *Report on Refuge Water Supply Investigations (3/1989)* and the *San Joaquin Basin Action Plan/Kesterson Mitigation Plan (12/1989)*, both reports incorporated into CVPIA by reference. Allocations are distinguished for two water types: Level 2 and Level 4. Level 2 Refuge Water Supplies refer to the historical annual average amount of water these refuges received between 1977 and 1984. Level 4 Refuge Water Supply is the annual amount of water needed for full development of the refuges based upon management goals developed in the 1980s. Incremental Level 4 is the difference between historic annual average water deliveries (Level 2) to refuges, and the refuge water supplies required to achieve optimum wetlands and wildlife habitat management (Level 4).

Section 3406(d)(2) requires that Reclamation provide full Level 4 supplies to all refuges starting in 2002. However, due to constraining issues including availability of water for Incremental Level 4 acquisition, funding and inadequate external conveyance capacity, Reclamation has not yet been able to meet that goal.

Approximately 3,000 acres of wetlands and waterfowl habitat at the Volta Wildlife Area (WA) require flooding to start mid-summer to provide feeding and resting areas for early arriving waterfowl in the fall. Volta WA is the first, and often only, area flooded in the GRCD this early in the year. The estimated annual Level 4 water requirement for Volta WA is 16,000 AF. Diversifying the uses of available CVP water and providing an additional dependable supply of water for Volta WA are the primary goals of this project. Reclamation is obligated to provide up to 13,000 AF of Level 2 water to the Volta WA pursuant to its management agreement with CDFG. An additional 3,000 AF is recommended for Incremental Level 4 supplies for a total of 16,000 AF.

## 1.2 Project Location

Volta WA is located approximately six miles northwest of Los Banos in western Merced County, as shown in Figure 1. Volta WA is owned by Reclamation and has been operated by California Department of Fish and Game (CDFG) since 1952 under a lease agreement. The refuge lies within the GRCD, along its southwest boundary. The Wasteway is the primary supply canal for the Northern Division of the GRCD. The Wasteway enters the Volta WA at the southwest corner and passes through the center. The water is lifted into two ditches by low lift pumps near Ingomar Grade Road. The ditches convey water to the eastern and western sections of the Volta WA. Water flows from the boundary ditches to internal ditches by gravity. The ditch along the southern boundary contains runoff from an adjacent dairy. Water is also diverted from the Wasteway via outtake pipes located near a check dam in the center of the Volta WA.

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VOLTA WASTEWAY
LEVEL 2 DIVERSIFICATION PROJECT

FIGURE 1
PROJECT LOCATION

# 2 DESCRIPTION OF PROPOSED ACTION

## 2.1 Project Objective

The objective of the proposed three-year pilot project is to develop a groundwater supply in the Volta WA that can be used to diversify Level 2 Refuge Water Supply sources and supplement the source of Incremental Level 4 Water Supply, improve water supply reliability for CVP contractors, and to confirm that the water quality is suitable for refuge use. Reclamation's objective is to produce up to 2,000 AF of groundwater per year from this program. The analysis of water quality would occur through the implementation of a groundwater monitoring program. The pilot project water would be supplied to Central Valley refuges that are entitled to receive CVP water pursuant to Section 3406(d) of the CVPIA and can receive the water by direct delivery from the Wasteway.

## 2.2 Proposed Action

In response to the ongoing drought and the Secretary of the Interior's responsibility to provide firm water supplies to the refuges, Reclamation proposes to provide American Recovery and Reinvestment Act (ARRA) funding for the installation of two groundwater production wells and two monitoring well clusters along the Volta Wasteway for a three year pilot project. The proposed well sites are located within the boundaries of the Volta WA. The purpose of the Proposed Action is to diversify a portion of the existing Level 2 water supplies delivered to the Volta WA and GRCD which would result in a like amount of CVP surface water made available for CVP agricultural contractors, while specific refuge water supply needs/obligations are satisfied. The Proposed Action will also provide for development of additional Incremental Level 4 water supplies which will augment the limited pool of Incremental Level 4 water available to those refuges south of the Delta. This Pilot Project would plan for, design, and construct the needed facilities (June 2010 start), and then operate the wells and monitor well production, water quality, and water levels during the three-year period (September 2010 to February 2013). The Pilot Project would implement monitoring at the two locations to confirm that water quality is suitable for refuge use. Based on the data acquired a determination would be made to continue or cease the diversification operations at any time during the Pilot Project.

New pilot wells at Volta WA would pump groundwater (anticipated production is up to 2,000 acre-feet [AF]) five months/year beginning in September/October through January/February of suitable quality that can be conveyed and used within Volta WA and GRCD. In order to provide flexibility, the duration and volume of groundwater pumped annually under the proposed action may increase to year round pumping of up to 5,000 AF. An increase would only occur if, after the first year of production at the 2,000 AF level, the monitoring data shows suitable water quality and water levels which would sustain additional pumping. Additionally, a sufficient surface water flow must be available in the Wasteway for dilution if it is necessary.

As stated previously, the groundwater would be utilized in the Volta WA and GRCD. The total amount of groundwater pumped annually would be split 50/50 between Level 2 and Level 4 water supply in order to address CVPIA Section 3406(d)(1) diversification goal. The groundwater would be substituted in lieu of south of Delta Refuges receiving a portion their CVP Level 2 surface water supply. The accepted ratio is two AF groundwater to one AF surface water.

It is anticipated that the use of groundwater could free up to 2,500 AF of CVP Level 2 surface water supply annually. The Level 2 water freed up by groundwater substitution would be delivered to the SLDMWA. SLDMWA contractors would utilize the CVP surface water supply within their service areas for reasonable and beneficial use. The Pilot Project would diversify refuge water supply, improve water supply reliability and minimize adverse impacts to CVP agricultural and municipal contractors.

Well-related construction activities which would occur as part of the Proposed Action include:

- Drill pilot borings to obtain information for the final design of the production and monitoring wells,
- Final design of the two production wells and five associated monitoring wells,
- Drill production wells and monitoring wells and place associated pipelines from wells to the Wasteway,
- Well testing to estimate the sustainable yield of the production wells, and
- Design and installation of the pump based on well testing results,
- Construction of the surface facilities (e.g., fences around wells), and
- Implementation of a three-year monitoring program

**Well Design Approach**

Well design would be in accordance with the American Water Works Association standards and the California Department of Water Resources for Well Standards, Bulletin 74-90 dated June 1991. A total target range of up to 2,000 AF/year is the anticipated production rate for pumping occurring between September/October through January/February. However, the actual yield may be more or less depending on aquifer conditions and changes to pumping durations.

**Test-Production Well Construction**

Reclamation plans to construct two- production wells. The construction window for the production wells is between May 1, 2010 and October 1, 2010. The entire construction window would not be necessary to erect the wells. It is anticipated that if construction begins in May 1, 2010, the production wells would be completed prior to June 2010. The production wells would produce groundwater from geologic units at depths ranging from approximately 500 to 900 feet below ground surface (bgs).

**Well Locations**

The two selected production well sites are located along the federal right-of-way abutting the Volta Wasteway at a distance of approximately 2,000 feet apart. Well Site #1 is located just north of and adjacent to the Volta Wasteway and Well Site #2 is located on the south side adjacent to the Volta Wasteway as shown on the aerial map in Figure 2. Figure 3 is a closer aerial view of the VWA and the well locations. The approximate GPS coordinates of the two wells, +/- 25 feet, are:

- Well Site #1: 37° 06' 22.147" latitude and 120° 56' 10.001" longitude, and
- Well Site #2: 37° 06' 26.986" latitude and 120° 55' 52.897" longitude.

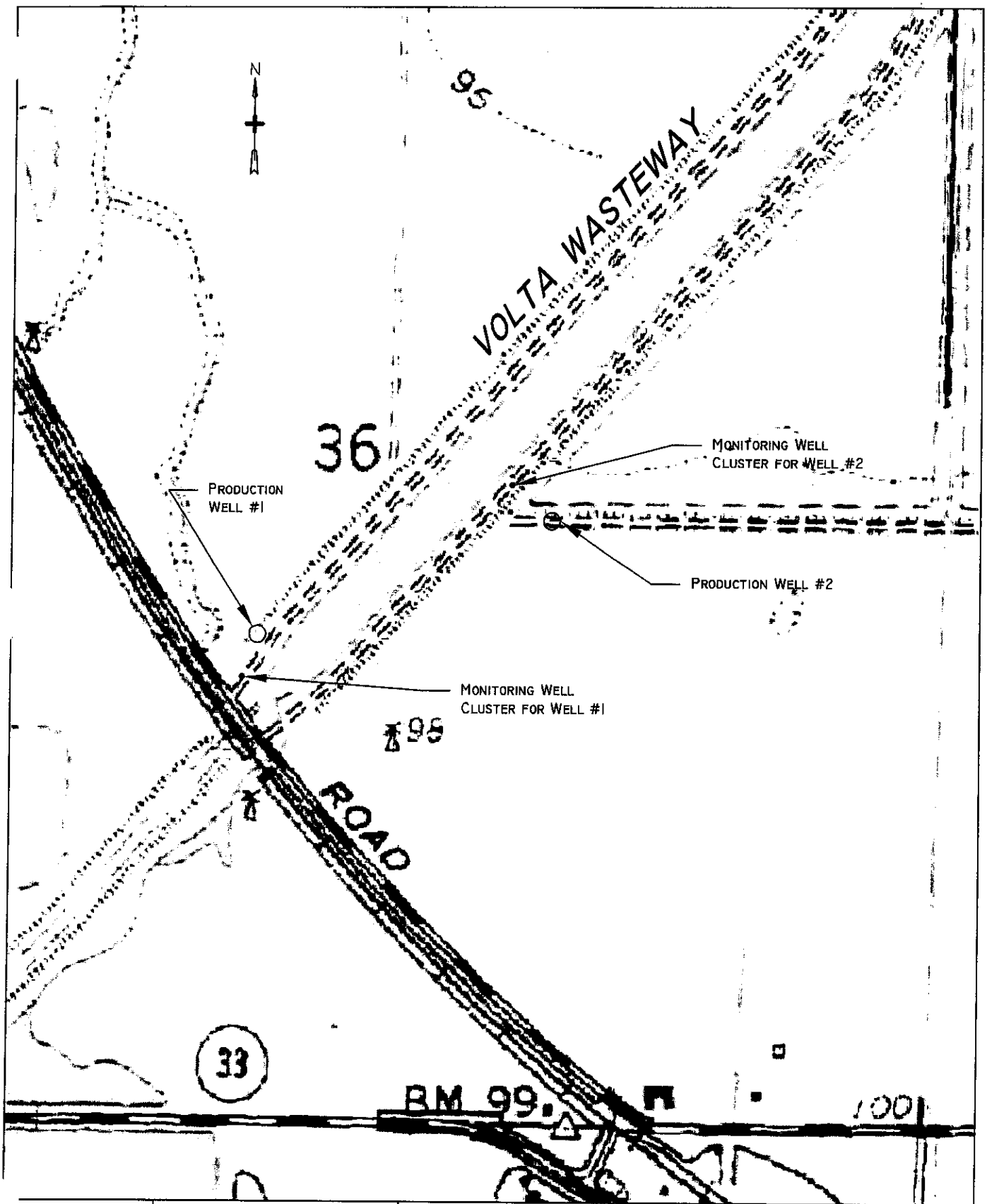
Access to the well sites would be by existing roads with short access road needed for Well Site #1. This short access road would be surfaced with gravel. A 30- to 40-foot gravel pad around each production well site would be necessary for routine operation and maintenance activities. A 150-foot x 150-foot work area would be needed for actual drilling. Staging, drilling and installation are estimated to require three weeks on site (15 days @10 hours/day) for each production well.

The production wells would be drilled using a large truck-mounted reverse circulation mud rotary drilling rig equipped with a mud pump, pipe rack, and drilling fluid holding tank/shaker system. Steel casing would be used for the two production wells. Concrete pads would be constructed and the production wellheads would be configured to accommodate electrical service to the wellhead as well as the discharge piping.

The pumps may range from 8 to 12 inches in diameter. The pump may be a submersible or a vertical turbine. The pump size and type would be determined after well testing has occurred and aquifer conditions are known

Construction discharge piping is necessary for the conveyance of groundwater from the wellhead to the Wasteway. Well #1 requires 100 feet of 12 inch PVC pipe and a trench 3 feet deep to the edge of the Wasteway. Well #2 requires 300 feet of 12 inch PVC pipe laid in a trench 3 feet deep at the minimum and 12 feet deep at the maximum. The areas would be trenched using a backhoe, restored after pipe is laid and recovered with trenched material. In addition, groundwater would be discharged in a manner to prevent bank disturbance. In order to dissipate the energy of the discharged water to a point that would not cause erosion, either a concrete discharge structure or a stainless steel structure would be utilized in conjunction with bank protection. The specifics for each well are:

- Well #1 and Well #2: The discharge pipeline would run perpendicular to the Wasteway from the wellhead. An underground pipe would convey the pumped groundwater to a concrete structure constructed on the Wasteway bank. The concrete or stainless steel structure would dissipate the energy to prevent erosion of the bank.

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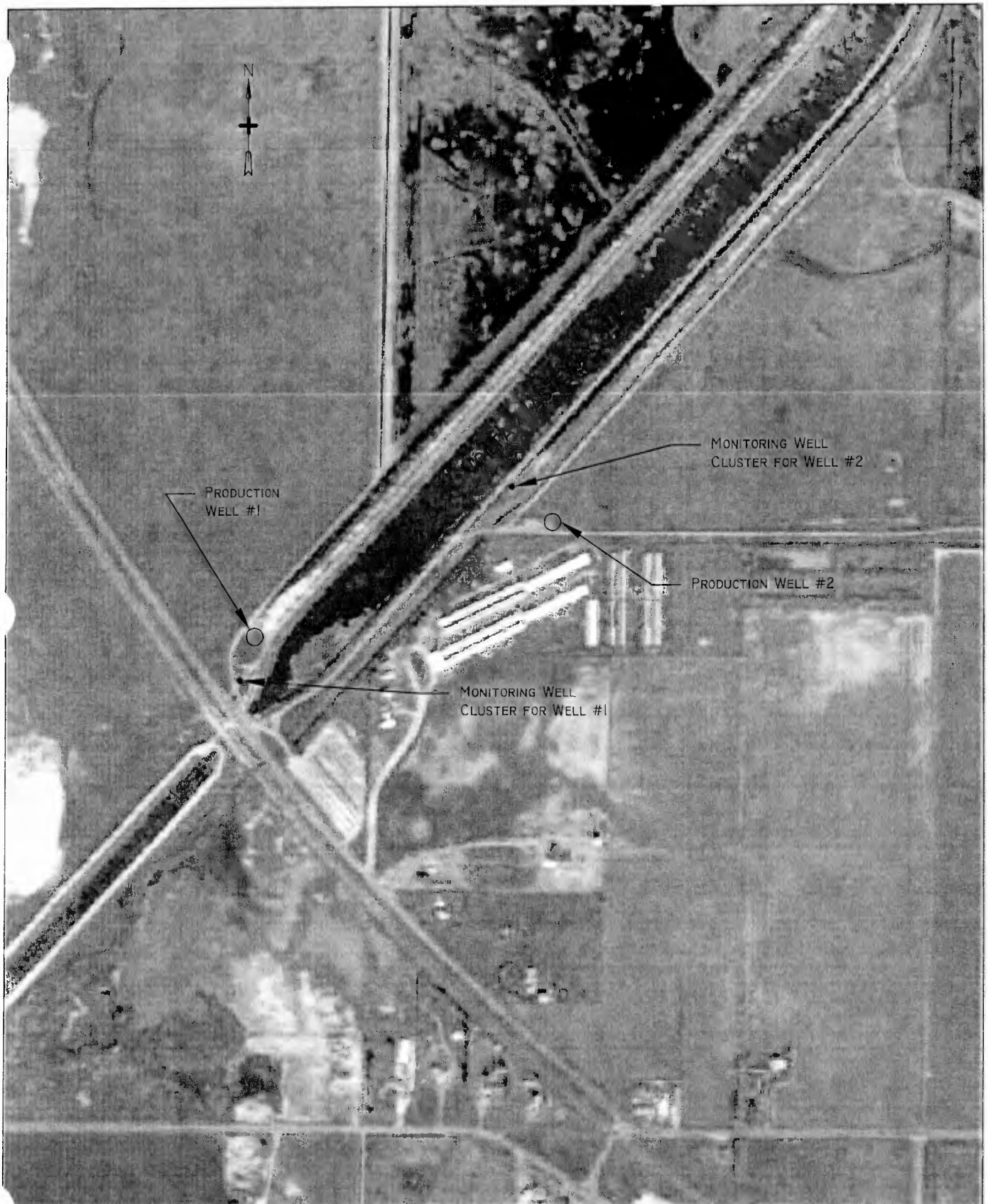
LAYOUT: Quad

VOLTA WASTEWAY
LEVEL 2 DIVERSIFICATION PROJECT

FIGURE 2
TOPOGRAPHIC MAP
OF WELL SITES

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VOLTA WASTEWAY
LEVEL 2 DIVERSIFICATION PROJECT

FIGURE 3
AERIAL PHOTO
OF WELL SITES

The width of the concrete or stainless steel structures outlet would depend on the well's yield. Once this is known, calculations would be made so that the discharge rate has a maximum velocity less than 3 feet per second.

The pilot boring would be drilled with a direct circulation mud rotary drill rig. In addition to the drill rig, the standard support equipment includes a drill stem trailer, compressor, and shaker unit to control the drill cuttings. A backhoe would likely be used to transport the drill cuttings from the production well site to a location to be determined in consultation with Reclamation and CDFG. During well construction, a larger reverse circulation drill rig would be used. In addition to the support equipment noted above, a transfer truck would be used to haul the gravel pack material to the well sites. The backhoe would also be used to dig a mud pit at each well site. The five monitoring wells would be installed with the direct circulation mud rotary drill rig to minimize land disturbance and costs.

The surface completions for each test-production well would consist of an 8-foot by 10-foot concrete pad and 20-inch discharge pipe. The wells would be located adjacent to the Wasteway. The discharge pipes of the wells would be routed from the well sites to the Wasteway and discharge would be at the edge of the Wasteway. A production well construction diagram is shown in Figure 4. Drilling of test holes for monitoring wells and construction of production wells is scheduled to begin in May 2010 and be completed by June 2010.

**Monitoring Wells**

A well cluster with a pair of monitoring wells would be drilled near each production well site to monitor water levels during the aquifer tests as well as throughout the three-year pilot project. The monitoring well clusters would include a well screened above the Corcoran Clay and one screened below the Corcoran Clay. A third monitoring well would be installed in association with Well #1 to monitor water levels within 100-feet of the surface. The purpose of the deep monitoring wells would initially be to assist in estimating aquifer hydraulic parameters during the aquifer tests, and later to assist in evaluating the sustainable pumping rates of the production wells and to assess the degree of well interference. The purpose of the shallow wells is to document the degree of communication, if any, between the deep production wells and the shallow aquifer during pumping. PVC casing would be used for the monitoring wells. Concrete pads and locking steel monuments would be installed around the monitoring wells.

The approximate GPS coordinates of the monitoring well clusters are:

- Well #1: 37° 06' 20.221" Latitude, 120° 26'10.8333" Longitude
- Well #2: 37 06' 28.521" Latitude, 120 55' 52.855" Longitude

Additional support vehicles including a water tender, front-end loader, pipe truck, and pickup trucks would be parked on-site. The drilling rig and associated equipment would occupy an area of approximately 150 feet by 150 feet. Access for these vehicles would be directly off the adjacent existing road for the Well #1 monitoring wells. No

improvements for site access would be required for Well #1 monitoring wells. A 300 foot long access road would be constructed to allow access to the Well #2 Monitoring Wells. This access road would be of similar construction as other existing roads in the VWA. No off-site discharge of drill cuttings or fluids would occur. Drill cuttings and inert bentonite clay, produced during drilling operations, would be contained in an on-site settling pond and spread on site in an approved location upon well completion

During the development phase, the water would initially be very turbid. The production wells would be sampled for the presence of selected constituents (e.g., Boron, Arsenic, Selenium) following well development and prior to performing the aquifer tests. The water quality results may factor into the management decision for the large volume of water to be discharged during the aquifer tests.

Following the completion of the aquifer tests and the estimation of the aquifer hydraulic parameters, well efficiency, and assessment of potential well interference, a recommendation would be made for the initial pumping rates. Based on water level measurements recorded during implementation of the groundwater monitoring plan, we would re-evaluate the originally selected pumping rates and revise original recommendations, if necessary, based on the monitored performance of the well.

The production wells would pump 24 hours a day for four to five months beginning in September/October through January/February. Reclamation may decide to pump an additional volume of groundwater annually based on well efficiency, well productivity, and monitoring program data collected the first year of the pilot project. The additional pumping would occur outside of the five month period. Any increases in the production volume and pumping window would be contingent upon water quality data and water level data gathered during the first year of production (at the up to 2,000 AF level). The data must show extended pumping and volumetric increases are feasible and would not result in significant impacts to any resources identified in this environmental assessment. In addition, sufficient surface water flow for dilution must be available in the Wasteway. The volume of water pumped from the production wells is dependent on the duration of pumping. Based on a value engineering report, the two production wells would produce up to 2,000 AF of groundwater/year if only operated for four to five months. If the wells are operated outside of September/October through January/February the production wells could produce up to 5,000 AF of groundwater.

## 2.3 Restrictions/Avoidance Areas

During placement of the wells, best management practices would be followed to ensure that this project is completed with minimal environmental impacts:

1 Disturbance of vegetation shall be kept to a minimum.
2. No debris, soil, etc., other than that already present within the well shall be allowed to enter the water.
3. No equipment shall be operated in stream channels.

4. No intentional harassment, killing, or collection of plants or animals at or around the work sites.
5. No firearms are allowed on site, except for those used by peace officers or CDFG wardens.
6. No pets allowed.
7. All persons must stay within the boundaries of the work sites, which consist of the top of the levees, walkways, public and private roadways and waters, and water-side levee slopes.
8. No off-road travel or work is permitted; all vehicles must be confined to existing levee roads.
9. All trash, including food-related trash and cigarette butts, must be properly disposed of and removed.
10. Storage of hazardous materials, such as fuel, oil, etc. shall not be allowed within 150 feet of waterways. Any chemical spills must be cleaned up immediately and reported as soon as possible.

Work would occur within the disturbed upland areas adjacent to the Wasteway. Some work would also occur on the banks of the Wasteway for placement of the discharge control structures to alleviate erosion in the Wasteway.

### 2.4 Permits

The following environmental regulatory requirements would be obtained for implementation of the proposed action:

- Federal Endangered Species Act – This Biological Assessment documents that the Pilot Project may adversely affect listed species (GGS).
- State Historic Preservation Office – Section 106 consultation required for disturbance to area for well drilling

## 3 CONSULTATION TO DATE

A site visit with U.S. Fish and Wildlife Service biologist, Maryann Owens, and the California Department of Fish and Game Volta WA Manager, Bill Cook, was conducted on August 13, 2009. During this site visit, the proposed well locations on either side of the Wasteway and Pond 10 of the Volta WA were observed.

# 4 SPECIES ACCOUNTS AND STATUS OF SPECIES IN THE ACTION AREA

A species list was requested from the U.S. Fish and Wildlife Service (USFWS) on October 26, 2009 and is included in Appendix A. Table 1 below identifies those species that potentially occur in or may be affected by projects in the Ingomar and Volta USGS 7.5-minute quadrangle sheets.

**Table 1: Species Identified as Potentially Occurring in the Ingomar and Volta USGS 7.5-minute Quadrangles**

| Common Name | Scientific Name | Federal Status[1] | Habitat in Area |
|---|---|---|---|
| **INVERTEBRATES** | | | |
| *Branchinecta longiantenna* | Longhorn fairy shrimp | E | No; vernal pools absent in area |
| *Branchinecta lynchi* | Vernal pool fairy shrimp | T | No; vernal pools absent in area |
| *Desmocerus californicus dimorphus* | Valley elderberry longhorn beetle | T | No; no elderberry shrubs present |
| *Lepidurus packardi* | Vernal pool tadpole shrimp | E | No; vernal pools absent in area |
| **FISH** | | | |
| *Hypomesus transpacificus* | Delta smelt | T | No; outside range |
| *Oncorhynchus mykiss* | Central Valley steelhead[2] | T | No; outside range |
| **AMPHIBIANS** | | | |
| *Ambystoma californiense* | California tiger salamander, central population | T | No; outside range |
| *Rana aurora draytonii* | California red-legged frog | T | No; outside range |
| **REPTILES** | | | |
| *Gambelia (=Crotaphytus) sila* | Blunt-nosed leopard lizard | E | No; outside range |
| *Thamnophis gigas* | Giant garter snake | T | **Yes** |
| **MAMMALS** | | | |
| *Dipodomys nitratoides exilis* | Fresno kangaroo rat | E | No; limited to the Alkali Sink and the Kerman Ecological Reserves, both in Fresno County |
| *Vulpes macrotis mutica* | San Joaquin kit fox | E | No; upland habitat limited in WA |

[1] E=Endangered, T=Threatened

[2] Listed under the jurisdiction of National Oceanic and Atmospheric Administration, Fisheries

## 4.1 Giant Garter Snake

**Current Status**

According to the USFWS Draft Recovery Plan for the Giant Garter Snake (1999), GGS inhabits wetland habitats within the Central Valley of California. Loss and fragmentation of wetland habitats have extirpated the GGS from the majority of its historic range. The USFWS listed GGS as threatened on October 20, 1993 (Federal Register 58:54053). No critical habitat has been designated for GGS.

**Habitat Requirements and Limiting Factors**

GGS inhabits agricultural wetlands and other waterways such as irrigation and drainage canals, sloughs, ponds, small lakes, low gradient streams, and adjacent uplands in the Central Valley. Essential habitat components consist of: (1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms; (2) emergent, herbaceous wetland vegetation, such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.), for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation upland habitats for cover and refuge from flood waters during the snake's inactive season in the winter (G. Hansen 1980, G. Hansen 1988, Brode and Hansen 1992, Hansen and Brode 1993 *referenced in* U.S. Fish and Wildlife Service 1999).

GGS bask in bulrush, cattails, shrubs overhanging the water, patches of waterweed (*Ludwigia peploides*) and other floating vegetation, and on grassy banks. In the San Joaquin Valley, GGS have also been observed basking in saltbush (*Atriplex* spp.) (Van Denburgh and Slevin 1918, Brode 1988 *referenced in* U.S. Fish and Wildlife Service 1999). Riparian vegetation such as saltbush and willows (*Salix* spp.) provide cover from predation. GGS also bask in openings in vegetation, created by riprap placed around water control structures. GGS use small mammal burrows, typically with sunny exposures along south and west facing slopes, and other soil crevices above prevailing flood elevations during winter (November to mid-March) (G. Hansen 1993 *referenced in* U.S. Fish and Wildlife Service 1999). Small mammal burrows, crayfish burrows, and soil crevices provide retreats from extreme heat for GGS during the active season (Hansen and Brode 1993 *referenced in* U.S. Fish and Wildlife Service 1999). Wintering sites varied from canal banks and marsh locations, to riprap along a railroad grade near the marsh (Wylie et al. 1997 *referenced in* U.S. Fish and Wildlife Service 1999). Wintering locations of radio-telemetered snakes tended to be in the vicinity of spring capture sites. GGS use burrows in the summer as much as 50 meters (164 feet) away from the marsh edge, whereas, overwintering snakes use burrows as far as 250 meters (820 feet) from the edge of marsh habitat (Wylie et al. 1997 *referenced in* U.S. Fish and Wildlife Service 1999).

The width of uplands used by GGS varies considerably. Many summer basking and refuge areas used by GGS are immediately adjacent to canals and other aquatic habitats and may even be located in the upper canal banks. USFWS has considered 200 feet as the width of upland vegetation providing habitat along the borders of aquatic habitat for GGS (USFWS 2006 *referenced in* Reclamation 2009). GGS also seek refuge in upland burrows during hot summer weather and have been documented up to 164 feet from aquatic habitat during this time. In a dynamic habitat, GGS frequently move in response to changing conditions in their rice, marsh, canal and ditch habitats, especially during the dry summer months. Connectivity between GGS home range size has been estimated from multiple studies conducted at Colusa NWR, and movement patterns have been described from studies within the Natomas and Colusa Basins. Home range size at Colusa NWR was reported to be as large as 2,792 acres in 1997 (Wylie et al. 1997 *referenced in* Reclamation 2009) and 427 acres in 2001 (Wylie et al. 2002 *referenced in* Reclamation 2009). The Draft Recovery Plan for Giant Garter Snake reports home range sizes as large as 642 acres at Gilsizer Slough and 202 acres at Badger Creek (USFWS 1999). Home range size is likely inversely correlated with habitat quality; such that smaller home range sizes occur in areas with the highest quality habitat. Recent work by Wylie and Hansen suggest that as long as conditions are optimal, snakes will stay close to where they over-winter and larger home range sizes are typically in response to adverse conditions.

GGS can move relatively long distances. Wylie et al. 1997 documented snakes moving up to 4.8 miles over a few days in response to de-watering at Colusa NWR. In the Natomas Basin, snakes routinely moved over a half mile and distances of over a mile were recorded on more than one occasion (Wylie and Casazza 2000 *referenced in* Reclamation 2009). A Colusa Basin study recorded the longest average movement distances of 0.62 miles, with the longest being 1.7 miles, for sixteen snakes in 2006, and an average of 0.32 miles, with the longest being 0.6 miles, for eight snakes in 2007 (Wylie and Amarello 2008 *referenced in* Reclamation 2009).

Because of the direct loss of natural habitat, the GGS relies heavily on rice fields in the Sacramento Valley, but also uses managed marsh areas in Federal National Wildlife Refuges and State Wildlife Areas. There have been only a few recent sightings of GGS in the San Joaquin Valley. Habitat loss and fragmentation, flood control activities, changes in agricultural and land management practices, predation from introduced species, parasites, water pollution, and continuing threats are the main causes for the decline of this species.

It has been suggested that selenium contamination and impaired water quality may be contributing factors in the decline of GGS (USFWS 1993 and USFWS 1999 *as referenced in* Hansen 2007). However, reptile toxicology information is lacking and no studies have been conducted that specifically examine toxicology in GGS (Hansen 2007). Research on species occupying a similar ecological niche as GGS (eastern water snakes) shows that bioaccumulation of trace elements, pesticides and other contaminants does occur in snakes and can result in adverse biological effects (Hansen 2007). While the effects of contaminants such as selenium on reptiles is not fully understood, toxicity thresholds are anticipated to be similar for reptiles, fish and birds, particularly for GGS

which feeds exclusively on aquatic prey (USFWS 1993 and USFWS 1999 *as referenced in* Hansen 2007).

**Status of Giant Garter Snake in Action Area**

In 1998, 1999 and 2000, surveys for GGS at Volta WA resulted in the capture of 11 snakes in Pond 26 and the Wasteway (northeast of Pond 26) (Sparks 2000). In 2001, surveys were unable to locate Volta WA populations previously found (Dickert 2001). In 2003, 31 GGS were captured at Volta WA and based on these numbers, CDFG estimated Volta WA's Wasteway population at 45 snakes (Dickert 2003). During this same time, juvenile GGS were captured in the Wasteway, but no neonates were captured (although remains of two neonate GGS were found in the stomachs of two of 28 bullfrogs captured in the Wasteway). In addition, 10 snakes captured in the Wasteway weighed less than 40 grams, indicating that GGS have been breeding at Volta WA (Dickert 2003). In 2004, 13 GGS were captured in the same locations as the 2003 study. The study concluded that construction dewatering may have been the cause for the dramatic decrease in GGS captured (Sloan 2004). Three snakes captured in 2003 were recaptured in 2004 and this, along with the presence of neonates in 2003, is an indication that a viable, breeding population is present at Volta WA (Sloan 2004). Finally, in 2006, seven GGS were captured in the same locations as the 2003 and 2004 studies (Sousa 2006).

# 5 ENVIRONMENTAL BASELINE

In 2001, Reclamation, USFWS, CDFG, and Grassland Water District entered into Long-term Water Supply Agreements for Refuge Water Supply pursuant to Sections 3406(d)(1) and 3406(d)(2) of Title 34 of Public Law 102-575 of the CVPIA, which included the Volta WA. An Environmental Assessment and Initial Study (EA/IS) was prepared between January and November 2000 to disclose any potential environmental impacts in accordance with NEPA and CEQA. The Finding of No Significant Impact (FONSI) found that the expected changes to on-refuge habitats resulting from implementation of the refuge water supply agreements would not adversely affect fish, wildlife or plant species nor would there be any significant effect on species listed pursuant to the Endangered Species Act. According to this document, it is CDFG's goal to preserve existing populations of all threatened and endangered species and to improve the overall conditions and status of those species, where possible (Reclamation, et al. 2001). It also states that the quality of water supplies to the Volta WA varies. Habitat management on the wildlife areas within the San Joaquin River Basin has been impaired by unreliable and poor quality water supplies. The lack of firm water supplies of adequate quality has limited management flexibility and the diversity of wetland habitat and species (Reclamation, et al. 2001).

There is suitable habitat for GGS in the waters and wetlands throughout Volta WA, including the Wasteway and Pond 10 wetlands area. GGS has been captured within the Volta WA, including Pond 10, 26 and the Wasteway near these two ponds.

The Volta Wasteway is the primary supply canal for the Northern Division of the GRCD. Water is released from the Delta Mendota Canal (DMC) to the Wasteway through a variety of control structures for distribution throughout the Northern GRCD. The Wasteway conveys flows directly to the Volta WMA through lift pumps, and to the GRCD through releases out of control structures located in Pond 10. Pond 10 structures are located at the terminus of the Wasteway and directly feed into the Santa Fe Canal Cross Channel, Mosquito Ditch and Malia Ditch (Figures 4 and 5). Wetlands in this region are typically flooded in late August to early September with flows in the Wasteway reaching 450 cfs. Wetland water elevations are maintained throughout the GRCD with maintenance flows from late October through the winter months to provide foraging and loafing habitat for waterfowl, shorebirds and other species. During the fall and winter maintenance flow periods, the Wasteway experiences flows up to 100 cfs. In the spring when soil temperatures are optimal for seed germination and successive plant growth, the wetlands are drained. Waters drained from these wetlands are conveyed to Mud Slough and Los Banos Creek which ultimately discharge to the San Joaquin River. Beginning in late April and continuing through the summer months, irrigation flows are delivered to the wetlands, filled and subsequently drained. During these periods the Wasteway can experience flows up to 150 cfs.

A tomato processing plant is located northwest of Volta WA and an abandoned swine production facility borders the south side of Volta WA. GRCD borders Volta WA to the north/northeast.

# 6 EFFECTS OF THE PROPOSED ACTION, INCLUDING CUMULATIVE EFFECTS

## 6.1 Direct Effects

Construction-related effects would be limited in extent to the immediate vicinity of the Volta Wasteway. Disturbance to the proposed action area would include a temporary increase of truck and worker foot traffic in what is currently a highly-frequented area (parking areas used by hunters). Some vegetation would be removed in the already disturbed areas as well as at the north and south embankments of the Wasteway for placement of erosion protection structures. The erosion protection structures would both be approximately 20 feet by 4 feet and would extend along the embankment from the end of the well discharge pipeline to three feet beyond the low water line to dissipate flow from the well. The structures would either be a Contech Armor Flex30S Erosion Control System or an engineer-approved equivalent. Placement of these two structures would require the removal of vegetative cover and may fill or crush burrows or crevices. The structures would remove potential GGS habitat and may obstruct movement of snakes. Because GGS utilize small mammal burrows and soil crevices as retreat sites, snakes may be crushed, buried, or otherwise injured from construction activities. Snakes may be run over by construction equipment or other vehicles accessing the construction sites. Construction disturbance may cause GGS to move; however, there is suitable habitat throughout Volta WA and GRCD for snakes to utilize.

# Volta Wildlife Area
# Water Quality Monitoring Locations

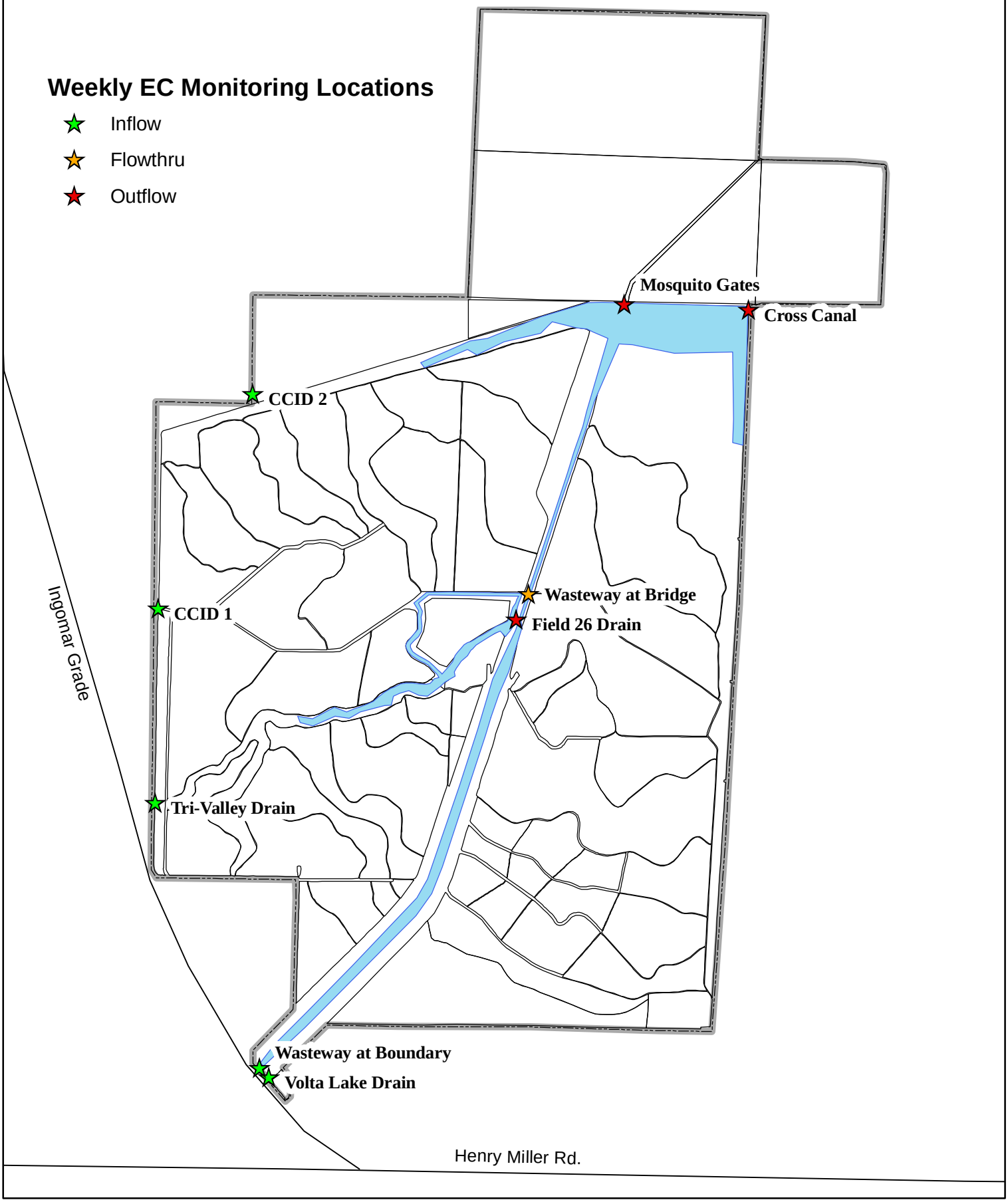


Figure 4 - Volta WA Water Quality Monitoring Locations


Figure 5 Volta Field/Pond Map

The proposed project would not induce or facilitate growth as it is diversifying the water supply at the Volta WA to benefit wildlife and does not provide additional water supplies for municipal users.

## 6.2 Indirect Effects

Potential benefits to GGS include additional water supply (Level 4) in the spring and summer. Seasonal wetlands throughout the units (ponds) at Volta, which provide suitable habitat for GGS, would receive more water, which would potentially benefit GGS.

Natural and managed seasonal wetlands and riparian communities often depend on surface water/groundwater interactions for part or all of their water supply. Subsurface drawdown related to groundwater pumping could result in hydrologic changes to nearby streams and marshes, potentially affecting GGS habitat. Before groundwater pumping is initiated, the hydrogeologic conditions of the two wells would be examined to minimize the potential risk of depleting surface water sources and adversely affecting hydrologic conditions of GGS habitat.

While the effects of poor water quality on GGS are unknown, it is believed that bioaccumulation of trace elements, pesticides and other contaminants does occur in snakes and can result in adverse biological effects. The proposed action is not likely to result in adverse effects to water quality in Volta WA; however, a water quality monitoring plan would be implemented to monitor surface and groundwater at the wells and in the Wasteway (see Appendix C). Parameters to be measured include the basic characteristics of the water (e.g., minerals), Total Dissolved Solids (TDS), nutrients (e.g., nitrates), pesticides, herbicides and insecticides, and metals (e.g., Mercury, Boron, Selenium, Arsenic and Uranium). Permanent or temporary impacts to water quality are not anticipated as the quality would be continuously tested and pumping would cease if the quality is compromised.

## 6.3 Interdependent and Interrelated Effects

In addition to the Proposed Action, other groundwater wells are being funded by ARRA throughout the Central Valley. The nearest area to Volta WA where additional groundwater wells are proposed is Grasslands Water District (GWD) to the north. There are currently 12 wells proposed by GWD, however, it is unknown at this time how many would actually be constructed. Particularly in the San Joaquin Valley, groundwater pumping can lead to subsidence, which could affect seasonal wetlands in Volta WA. However, during this three-year pilot program, continuous testing of the aquifer would occur to assess the effects of pumping on the aquifer. Should significant changes to the aquifer be identified, pumping of the two production wells at Volta WA would cease.

If not for the Proposed Action, additional Incremental Level 4 water would not likely be available to Volta WA and GRCD. This water would help to optimize wildlife habitat, including that for GGS, in an area where GGS are already known to exist.

## 6.4 Cumulative Effects

The Proposed Action is a pilot program and if at the end of the three years the program is determined to be no longer needed or beneficial, CDFG will continue to manage their water for GGS habitat. Potential benefits may occur to GGS in that additional water may be available during spring and summer when GGS is active and requires a permanent water source. No other state or local actions are proposed in the area that would impact GGS.

## 6.5 Measures to Avoid Take of Special-status Species

Standard Avoidance and Minimization Measures for GGS would be implemented during construction (see below). By implementing these measures, take of these special-status species would be reduced or eliminated. Since GGS habitat is not being directly impacted, there are no mitigation or conservation measures, or compensation/set-asides proposed.

**Giant Garter Snake**

To avoid take of GGS, the following measures would be implemented:

- Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
- Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for GGS and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30, contact the USFWS Sacramento office to determine whether additional measures are necessary to minimize and avoid take.
- Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided GGS habitat within or adjacent to the project area as Environmentally Sensitive Areas. This area should be avoided by all construction personnel.
- Construction personnel should receive a USFWS-approved worker environmental awareness training. This training instructs workers to recognize GGS and its habitat(s).
- The project area should be surveyed for GGS 24 hours before construction activities. Survey of the project area should be repeated if a lapse in construction activity for two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the USFWS immediately by telephone at (916) 414-6600.
- After completion of construction activities, remove any temporary fill and construction debris, and wherever feasible, restore disturbed areas to pre-project conditions. Restoration work may include replanting species removed from banks or with emergent vegetation in the active channel.

- In the event that take cannot be avoided, contact the USFWS for information before starting the action.

In addition to those measures identified above, the measures (water quality and biological monitoring) identified in the attached Monitoring Plan (Appendix C) will be incorporated as part of the Pilot Project to lessen the potential for impacts to GGS

# 7 CONCLUSION/DETERMINATION OF EFFECT

Placement of the two wells would be limited in extent to only the immediate vicinity of the Wasteway. Total disturbance to the action area would include temporarily increased truck and worker foot traffic in what is currently a highly-frequented area as a result of well placement. Some vegetation will be removed along the north and south embankments of the Wasteway for placement of erosion control structures (approximately 4 feet by 20 feet) and could potentially affect GGS if in the area as this is potential GGS habitat.

Groundwater from the production wells placed on either side of the Wasteway would be pumped into the Wasteway and delivered downstream throughout the Volta WA and could be delivered to other refuges in the area (i.e., GRCD). Water quality would be continually tested at the outflow and if determined to be of poor quality, pumping into the Wasteway would cease at the end of the three-year pilot study.

The proposed action may benefit GGS in that it would provide additional water during the snake's active period (spring and summer).

The proposed action ***may affect, is likely to adversely affect*** GGS. Restrictions during well placements and avoidance and minimization measures would help to reduce the potential for take of GGS.

The proposed project would have ***no effect*** on the following ESA listed species due to a lack of suitable habitat in the action area and/or lack of occurrences in this area:

- San Joaquin kit fox
- Longhorn fairy shrimp
- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp
- Valley elderberry longhorn beetle
- Delta smelt
- Central Valley steelhead
- California tiger salamander, central population
- California red-legged frog
- Blunt-nosed leopard lizard
- Fresno kangaroo rat

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# 10 GLOSSARY

**Action area** – all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

**Cumulative effects** – those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur in the action area of the Federal action subject to consultation.

**Effects of the action** – refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline.

> **Environmental baseline** – includes the past and present impacts of all Federal, State or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions that are contemporaneous with the consultation in process.
>
> **Indirect effects** – Indirect effects are those that are caused by the action(s) and are later in time, but are still reasonably certain to occur.
>
> **Interdependent actions** – Interdependent actions are those that have no significant independent utility apart from the action that is under consideration, i.e., other actions would not occur but for this action.
>
> **Interrelated actions** – Interrelated actions are those that are part of a larger action and depend on the larger action for their justification, i.e., this action would not occur but for a larger action.

**Likely to jeopardize the continued existence of** – to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers or distribution of that species.

**May affect, not likely to adversely affect** – the appropriate conclusion when effects on a listed species are expected to be discountable, insignificant or completely beneficial.

> **Beneficial effects** – contemporaneous positive effects without any adverse effects.
>
> **Insignificant effects** – relate to the size of the impact and should never reach the scale where take would occur.
>
> **Discountable effects** – those that are extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect or evaluate insignificant effects; or (2) expect discountable effects to occur.

**May affect, likely to adversely affect** – the appropriate finding if any adverse effect may occur to listed species or critical habitat as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant or beneficial.